El Niño Briefing for SE California & SW/SC Arizona

NOAA/NWS Phoenix, AZ

Issued: November 19, 2009

Overview

The term El Niño refers to the large-scale ocean-atmosphere climate phenomenon linked to a periodic warming in sea surface temperatures across the central and east-central equatorial Pacific Ocean. El Niño represents the warm phase of the El Niño/Southern Oscillation, or ENSO, cycle.

The current El Niño has undergone an intensification process during the past month and is now border-line between a moderate and strong event. Based on observational and model data, El Niño is expected to remain moderate/strong through Winter 2009-2010 and continue into Spring 2010. There will be an increased chance for above normal rainfall this winter across southeast California and southwest/south-central Arizona.

Past and Current Conditions

During the past month, the current El Niño event has undergone significant strengthening/warming, due in part to an increase in oceanic Kelvin wave activity associated with the Madden-Julian Oscillation (Fig. 1). Sea surface temperatures (SST) anomalies in the Niño 3.4 region (blue box, Fig. 2) have increased from +0.7 °C a month ago to +1.7 °C currently. The threshold for El Niño conditions is +0.5 °C, with strong conditions roughly considered above +1.5 °C (Fig. 3).

The most recent Oceanic Niño Index (ONI), a three-month average of SST anomalies in the Niño 3.4 region, computed for the period August 2009 through October 2009, was +0.9 °C. A warm (El Niño) episode is said to have occurred when the ONI is at-or-above 0.5 °C for five consecutive three-month periods; thus far, the ONI has been at-or-above 0.5 °C for four consecutive three-month periods. With the recent warming, it is virtually certain this will be a full-fledged El Niño event.

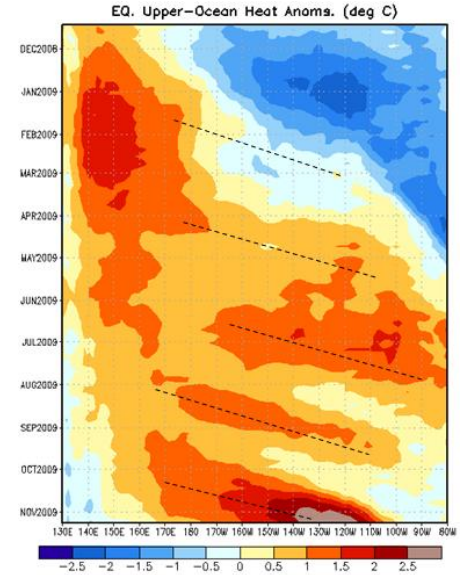

Figure 1 – Upper-ocean heat content in the Pacific Ocean during the past year (x-axis latitude, y-axis time). Oceanic Kelvin waves have alternating warm and cold phases. The warm phase is indicated by dashed lines. Strong activity recently has led to a strengthening of El Niño conditions.

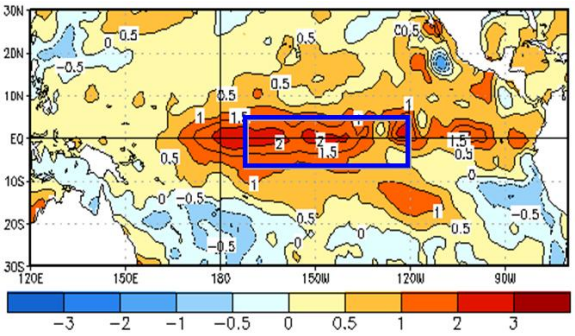

Figure 2 – Average SST anomalies in the Pacific Ocean, from 18 October 2009 through 14 November 2009. The blue box represents the Niño 3.4 region where the most recent weekly temperature anomaly was +1.7 °C, a full degree increase from a month ago.

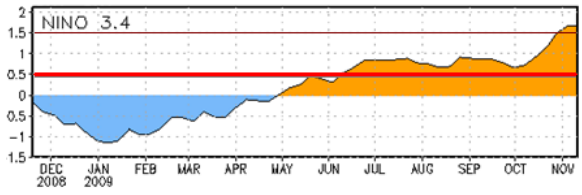

Figure 3 – SST anomalies in the Niño 3.4 region since Fall 2008. Values above +0.5 ºC (thick red line) indicate El Niño conditions with values above +1.5 °C generally classified as "strong". Note that SSTs have recently climbed toward strong levels.

An analysis of past data shows how ENSO impacts winter precipitation in the Southwest. Figure 4 breaks down Dec-Mar precipitation for Arizona and southeast California differentiated by the ENSO state during the previous fall. When El Niño conditions are present during Sep-Oct-Nov, winter precipitation is typically above average. However, when El Niño conditions are separated by strength, above average winter precipitation is shown to be most likely when strong El Niño conditions are already present in the fall (Fig. 5).

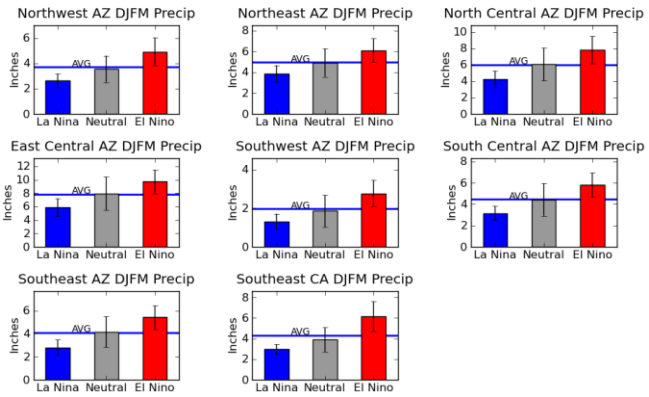

Figure 4 – Dec-Mar precipitation by sub-state region based on the state of ENSO during Sep-Oct-Nov.

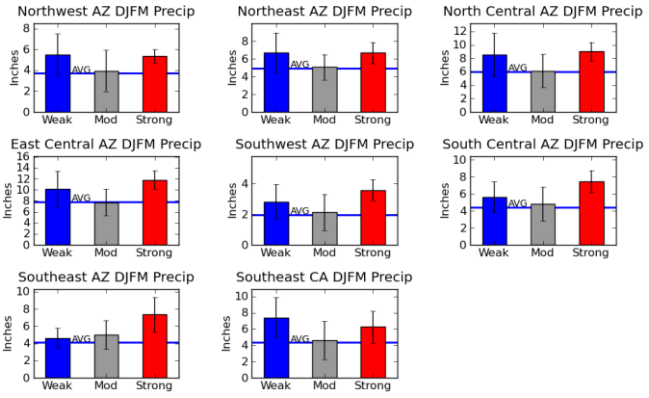

Figure 5 – Dec-Mar precipitation by sub-state region based on the strength of El Niño during Sep-Oct-Nov.

Outlook

The large-scale weather pattern continues to respond to the El Niño conditions in the Pacific. With boreal winter also approaching, the northern hemisphere is becoming more active with the frequency and intensity of Pacific storm systems increasing.

The official December-January-February Outlook from the Climate Prediction Center (CPC) calls for increased chances for the average three month temperature to be above normal across southwest/south-central Arizona (Fig. 6). For the three month total precipitation, there will be an increased chance for above normal precipitation across southeast California and southwest/south-central Arizona precipitation to be above, near, or below normal (Fig. 7).

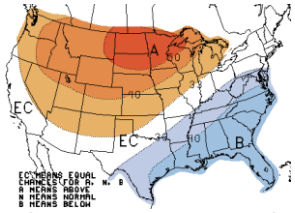

Figure 6 –Dec-Jan-Feb Temperature Outlook.

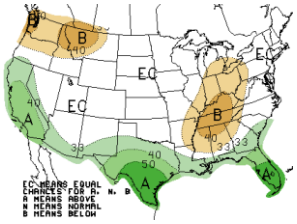

Figure 7 –Dec-Jan-Feb Precipitation Outlook.

The official January-February-March Outlook from CPC calls for equal chances for the average three month temperature to be above, near, or below normal (Fig. 8). There will be an increased chance for the three month total precipitation to be above normal (Fig. 9).

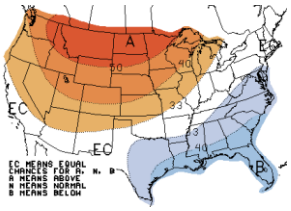

Figure 8 – Jan-Feb-Mar Temperature Outlook.

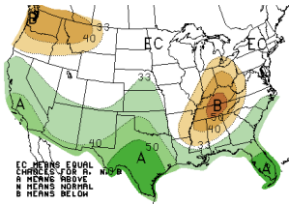

Figure 9 – Jan-Feb-Mar Precipitation Outlook.

Additional Information

NOAA CPC ENSO Page:
http://www.cpc.ncep.noaa.gov/products/precip/CWlink/MJO/enso.shtml

NOAA El Niño Page:
http://www.elnino.noaa.gov

NOAA CPC Outlooks:
http://www.cpc.ncep.noaa.gov/products/predictions/30day/

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